IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Mikhail Laksin et al.

Application No.: 10/586,098 Confirmation No.: 1736

Filed: January 14, 2005 Art Unit: 2853

For: HYBRID ENERGY CURABLE SOLVENT BASED LIQUID PRINTING INKS Examiner: M. S. Shah

APPEAL BRIEF

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on December 16, 2010, and is in furtherance of said Notice of Appeal.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Sun Chemical Corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 20 claims pending in application.

B. Current Status of Claims

1. Claims canceled: none
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 1-20
4. Claims allowed: none
5. Claims rejected: 1-20

C. Claims On Appeal

The claims on appeal are claims 1-20

IV. STATUS OF AMENDMENTS

Applicant did not seek to amend the claims after Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Organic solvent- and/or water-based liquid flexo or gravure inks ("solvent-based printing inks") have been widely used in various types of printing, such as on packaging, using inkjet printers. The printed images should have good solvent and abrasion resistance. At the same time, it is necessary for solvent-based printing inks to have good re-solubility to avoid ink drying and clogging on the plate, anilox and gravure cylinders of the printers. Typically, low molecular weight (MW) resins and plasticizers offer good re-solubility, but those higher MW resins which improve the resistance properties of the printed images have poor re-solubility are required for these inks. This represents a major contradiction and problem for the formulators of the solvent-based packaging liquid inks.

To solve these problems, various types of photocurable printing inks having specific combinations of photocurable resins and photoinitiators have been developed. However, incomplete polymerization of these inks often results in diffusion of uncured resins and causes smears or abrasion of the printed images.

The claimed invention is based, *inter alia*, on the discovery that organic solvent- and/or water-based liquid printing ink which certain amounts of energy curable (EC) monomers and/or oligomers of resin in addition to conventional solvent-based ink components, has excellent re-solubility even after drying and, upon exposing to an actinic radiation, such as electron beam (EB) and ultraviolet light (UV), and has improved resistance to chemicals, solvents, water and moisture. The claimed invention is thus a hybrid energy curable solvent-based liquid printing ink, and the method by which it is used.

The sole independent claim can be mapped, *inter alia*, as follows:

1. A hybrid energy curable solvent based printing ink (page 1, line 5-6) comprising:

(i) a solvent-soluble resin (page 2, lines 16-17);

(ii) an energy curable monomer, oligomer, or mixture thereof (page 2, lines 17-18);

(iii) a vehicle comprising solvent (page 2, lines 18-19); and

(iv) pigment (page 3, line 24).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-20 have been rejected under 35 U.S.C. §103 over Ylitalo (US 2003/0083396) in view of Knox (US 6,398,861).

Claims 1-20 have been rejected under 35 U.S.C. §103 over Ylitalo (US 2003/0083396) in view of Tsuyoshi (US 2004/0150712).

VII. ARGUMENT

Solvent-based printing inks, such as organic solvent- and/or water-based liquid flexo or gravure inks, have been widely used in various types of printing, such as on packaging, using inkjet printers for instance. While the resulting printed images should have good solvent and abrasion resistance, it is also necessary for the solvent-based printing inks to exhibit good re-solubility in order to avoid dried ink to form and clog the plate, anilox and gravure cylinders of the printers. While low molecular weight (MW) resins and plasticizers offer good re-solubility, they can give prints with inadequate resistance. Therefore, the use of higher MW resins is desirable because they improve the resistance properties of the printed images, but, unfortunately, such higher

MW resins have poor re-solubility. This major contradiction presents a problem for formulators of the solvent-based packaging liquid inks.

Prior to the present invention, various types of photocurable printing inks having specific combinations of photocurable resins and photoinitiators were developed to solve these problems. However, the incomplete polymerization of these inks often results in diffusion of uncured resins and causes smears or abrasion of the printed images.

The applicants discovered that organic solvent- and/or water-based liquid printing inks which certain amounts of energy curable (EC) monomers and/or oligomers of resin in addition to conventional solvent-based ink components, have excellent re-solubility even after drying and, upon exposing to an actinic radiation, such as electron beam (EB) and ultraviolet light (UV), have improved resistance to chemicals, solvents, water and moisture.

The appealed claims are directed to these hybrid energy curable solvent-based liquid printing inks, and the method by which they are used. The claims are not rendered obvious by the combination of references proposed in the Final Rejection.

The §103 Rejection Over Ylitalo In View Of Knox Is Untenable

Ylitalo teaches an ink-jet printing ink which has been specifically designed to overcome a specific problem encountered when the ink contained a usual surfactant, namely foaming. It was found that the problem could be overcome if the surfactant was a fluorinated surfactant. As a consequence, the resulting ink must contain a fluorinated surfactant, colorant and a vehicle. The ink is designed to cure by polymerization or cross-linking, and therefore also requires the presence of a

photoinitiator [0086]. Ylitalo's ink may also contain a plethora of other materials, all of which are optional. The reference sets forth twenty-one (21) categories of such optional materials in [0021]. One of the optional materials is an energy-curable material [0085]-[0093].

Another one of the Ylitalo optional components is the category of solvents, which may be aqueous or organic, and when present, are chosen to provide desired physical properties, such as viscosity and the like [0080]. But paragraph [0080] also states "For radiation curable ink, the solvent component is desirably absent. However, a small amount may be desirable under certain circumstances." The word "certain" has been underlined in the quotation because it indicates the solvent may be desirable only under some circumstances, but Ylitalo never reveals what those circumstances constitute. The Advisory Action contends that the reference does not have to identify the circumstances since a solvent-containing radiation curable ink is encompassed by the disclosure. What this contention overlooks is that a solvent-free radiation curable ink is also encompassed, and the reference never provides any guidance about when a solvent should be present. It clearly cannot be to solvate any solvent-soluble resin because, as the Final Rejection has acknowledged, Ylitalo fails to teach or suggest a composition in which any solvent-soluble resin can be present.

Ylitalo thus fails to teach or suggest a composition simultaneously containing the solvent-soluble resin the Final Rejection acknowledges to be absent and two optional ingredients.

It is clear and axiomatic that there must be a reason for consulting a secondary reference. Possibilities include a need to improve or provide a feature

lacking in the primary reference, or to correct a deficiency in that reference. But there is nothing in Ylitalo to suggest that its composition needs improvement or is deficient or lacks some feature. The only apparent reason to look beyond Ylitalo is a need to find a missing element in the template of the appealed claims, but "[i]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. *In re Fritch*, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

MPEP 2143 instructs that "The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." No valid reason has been articulated here.

The Final Rejection does propose justifications for consulting a secondary references, they lack a factual basis, at best, are retrospective conclusions that an unstated advantage would be realized, and they fail to address or provide an answer to the question of why would one incorporate a solvent-soluble resin in the radiation curable composition which Ylitalo in the first instance, particularly since it teaches the composition should preferably not contain a solvent? A reason to use something in one reference is not, *ipso facto*, a reason to use it in a completely different set of circumstances. There are no valid reasons to combine references as proposed in the Final Rejection.

Given that Ylitalo teaches that both the energy-curable material and solvent are optional, and therefore may or may not be present, there must be a reason to first choose to include both the energy-curable material and solvent simultaneously, and having done so, to also extract some teaching from a secondary reference and modify

Ylitalo using that teaching. None of the reasons proffered in the Final Rejection are tenable.

Knox has been cited to teach compositions which can contain a solvent-soluble resin. But that fact, standing alone, is not a reason to incorporate the solvent-soluble resin in a composition like that of Ylitalo which is designed to cure by a different mechanism, namely polymerization or cross-linking, thereby requiring the presence of a photoinitiator [0086], and which composition is preferably solvent-free [0080].

The Final Rejection advances the proposition on page 3 that a reason to rely on Knox is that it "teaches that to get printed image with good adhesion, ink composition comprises the solvent-soluble resin" (sic). However, there is no such teaching in Knox. The only reference to "good adhesion" in Knox is found at column 9, line 47 in the middle of a working example and does not attribute "good adhesion" to any type of resin, but instead attributes it to the manner in which a metal flake pigment was processed. Indeed, most of Knox's disclosure is concerned with the manner in which the metal pigment is prepared. The function of the solvent-soluble resin disclosed in this reference is to bind metal pigment flakes together to prevent them from becoming airborne as dust (col. 7, lines 20-22) as a result of grinding. This Final Rejection proposed reason is therefore based only on silence in the reference but obviousness cannot be predicated on the unknown. *In re Newell*, 13 USPQ2d 1248, 1250 (Fed. Cir. 1989); *In re Burt*, 148 USPQ 548, 553 (CCPA 1966).

The Final Rejection next asserts that Knox indicates the organic binder media "include" those habitually employed in inks. In this instance also, the Final Rejection is

not based on anything described in Knox but instead relies on silence – Knox does not teach that the binder needs to be a solvent-soluble resin. Disregarding the silence and the missing factual basis for the contention, the Final Rejection continues by stating on page 6, again without any factual basis, that it is "well known" that solvent soluble resin is used in "the ink composition" and "it doesn't matter it is energy curable ink or regular ink." Applicants challenged this contention and requested a document or Examiner affidavit supporting the assertion, as required under MPEP 2144.03, but none has ever been supplied. Accordingly, the missing factual basis in the record for this speculation is still missing and this proposed justification is based solely on silence.

The Final Rejection then concludes with an assertion (repeated in the Advisory Action) that the non-existent resin improves the "application property" citing column 6, lines 65-67. However, when the cited support for this assertion is consulted, it is seen that there is no reference to a solvent-soluble resin but instead, the disclosure concerns the use of liquid organic binders as plasticizers combined with resin to provide structural rigidity to metal pigment particles in a composition which is not an energy-curable material.

Thus, all of the proposed reasons and justifications for combining Knox with Ylitalo are not valid. They are based on silence, and are retrospective conclusions that unstated advantages would follow from the suggested combination, which conclusions are " not a substitute teaching or suggestion which supports the selection and use of the various elements in the particular claimed combination. *In re Newell*, supra.

The rejection based on the combination of Ylitalo and Knox is untenable, and should be reversed.

The §103 Rejection Over Ylitalo In View Of Tsuyoshi Is Untenable

The discussion above concerning Ylitalo applies with equal force to this rejection.

Like Knox, Tsuyoshi has been cited to teach compositions which can contain a solvent-soluble resin. Here also, that isolated fact is not a reason to incorporate the solvent-soluble resin in a composition like Ylitalo which is designed to cure by a different mechanism, namely polymerization or cross-linking, thereby requiring the presence of a photoinitiator [0086], and which composition is preferably solvent-free [0080].

The Final Rejection proposes on page 5 that the reason to rely on Tsuyoshi is that it "teaches that to get printed image with good adhesion, ink composition comprises the solvent-soluble resin (see Abstract; [0039])". Once again, there is no such teaching in the secondary reference. There is only silence in Tsuyoshi's Abstract and paragraph [0039], and that is insufficient. *In re Newell*, supra; *In re Burt*, supra. Nowhere else in this reference is there a teaching about "good adhesion". This proposed justification for the combination with Ylitalo is therefore untenable.

The Tsuyoshi printing ink contains a Monascus pigment, which is a type of pigment which maintains its integrity until it is quickly discolored on exposure to visible light and/or ultraviolet light (see, *inter alia*, the Abstract). The reference does indicate that ink jet inks may contain a binder. Just from the use of the word "binder", the Final Rejection asserts that any pigment based ink containing a binder must have "good binding characteristics to the medium", providing an image with "good adhesion characteristics". Once again, this assertion finds no basis in Tsuyoshi itself,

and no document or Examiner affidavit is presented in support of this baseless speculation about what properties a "binder" would provide to some unidentified "medium".

As in the other rejection, there is nothing in Ylitalo to suggest that its composition needs improvement or is deficient or lacks some feature, and therefore, there is no reason to consult Tsuyoshi in the first instance. The justifications proposed are again, at best, retrospective conclusions about unstated advantages, constructed from silence and lacking a factual basis, and they fail to address or provide an answer to the basic question of why would one incorporate a solvent-soluble resin in the radiation curable composition which Ylitalo teaches should preferably not contain a solvent?

There are no valid reasons to combine Ylitalo and Tsuyoshi, and this rejection is untenable. It should be reversed.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

Dated: February 9, 2011

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/586,098

1. A hybrid energy curable solvent based printing ink comprising:

(i) a solvent-soluble resin;

(ii) an energy curable monomer, oligomer, or mixture thereof;

(iii) a vehicle comprising solvent; and

(iv) pigment.

2. The printing ink of claim 1, wherein the energy curable monomer, oligomer, or mixture thereof, is an ethylenically unsaturated monomer, oligomer, or mixture thereof.

3. The printing ink of claim 1, wherein the energy curable monomer, oligomer, or mixture thereof, is in an amount of about 1% to 50% by weight of the printing ink.

4. The printing ink of claim 1, wherein the solvent-soluble resin is in a range between about 0.1% to about 40% by weight of the printing ink.

5. The printing ink of claim 4, wherein the solvent-soluble resin comprises nitrocellulose, acrylate, methacrylate, polyester, polyamide, copolymer of styrene and maleic anhydride, polyurethane and epoxy.

6. The printing ink of claim 1, wherein the vehicle comprises water, methanol, ethanol, n-propanol, iso-propanol, n-butanol, sec-butanol, tert-butanol, iso-butanol, n-pentanol, or ethyl acetate.

7. The printing ink of claim 1 further comprising a photoinitiator.

8. The printing ink of claim 7, wherein the photoinitiator is in an amount between about 0.1% and about 20% by weight of the printing ink.

9. The printing ink of claim 7, wherein the photoinitiator is selected from the group consisting of benzophenone, acetophenone, fluorenone, xanthone, thioxanthone, carbazole, benzoin, the allyl benzoin ethers, 2- or 3- or 4-bromoacetophenone, 3- or 4-allylacetophenone, m- or p-diacetylbenzene, 2- or 3- or 4-methoxybenzophenone, 3,3'- or 3,4'- or 4,4'-dimethoxybenzophenone, 4-chloro-4'-benzylbenzophenone, 2- or 3-chloroxanthone, 3,9-dichloroxanthone, 2- or 3-chlorothioxanthone, 3-chloro-8-nonylxanthone, 3-methoxyanthone, 3-iodixanthone, 2-acetyl-4-methylphenyl acetate, alkyl and aryl ethers of benzoin, phenylglyoxal alkyl acetals, 2,2'-dimethoxy-2-phenyl-acetophenone, 2,2-diethoxyacetophenone, 2,2-diiso-propoxyacetophenone, 1,3-diphenyl acetone, naphthalene sulfonyl chloride, and mixtures thereof.

10. A method of printing comprising:

(i) printing a substrate with the printing ink of claim 1;

(ii) drying the printed ink; and

(iii) exposing the printed ink to an actinic radiation.

11. The method of claim 10, wherein steps (ii) and (iii) are performed sequentially.

12. The method of claim 10, wherein steps (ii) and (iii) are performed simultaneously.

13. The method of claim 10, wherein the actinic radiation is an electron beam.

14. The method of claim 10, wherein the printing ink further comprising a photoinitiator.

15. The method of claim 14, wherein the actinic radiation is a ultraviolet light.

16. The method of claim 14, wherein the photoinitiator is selected from the group consisting of benzophenone, acetophenone, fluorenone, xanthone, thioxanthone, carbazole, benzoin, the allyl benzoin ethers, 2- or 3- or 4-bromoacetophenone, 3- or 4-allylacetophenone, m- or p-diacetylbenzene, 2- or 3- or 4-methoxybenzophenone, 3,3'- or 3,4'- or 4,4'-dimethoxybenzophenone, 4-chloro-4'-benzylbenzophenone, 2- or 3-chloroxanthone, 3,9-dichloroxanthone, 2- or 3-chlorothioxanthone, 3-chloro-8-nonylxanthone, 3-methoxyanthone, 3-iodixanthone, 2-acetyl-4-methylphenyl acetate, alkyl and aryl ethers of benzoin, phenylglyoxal alkyl acetals, 2,2'-dimethoxy-2-phenyl-acetophenone, 2,2-diethoxyacetophenone, 2,2-diiso-propoxyacetophenone, 1,3-diphenyl acetone, naphthalene sulfonyl chloride, and mixtures thereof.

17. The method of claim 10, wherein the energy curable monomer, oligomer, or mixture thereof, is an ethylenically unsaturated monomer, oligomer, or mixture thereof.

18. The method of claim 10, wherein the energy curable monomer, oligomer, or mixture thereof, is in an amount of about 1 to 50% by weight of the printing ink.

19. The method of claim 10, wherein the solvent-soluble resin is in an amount of about 0.1% and about 40% by weight of the total ink.

20. The method of claim 10, wherein the vehicle comprises water, methanol, ethanol, n-propanol, iso-propanol, n-butanol, sec-butanol, tert-butanol, iso-butanol, n-pentanol, or ethyl acetate.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.